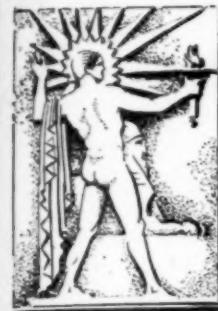


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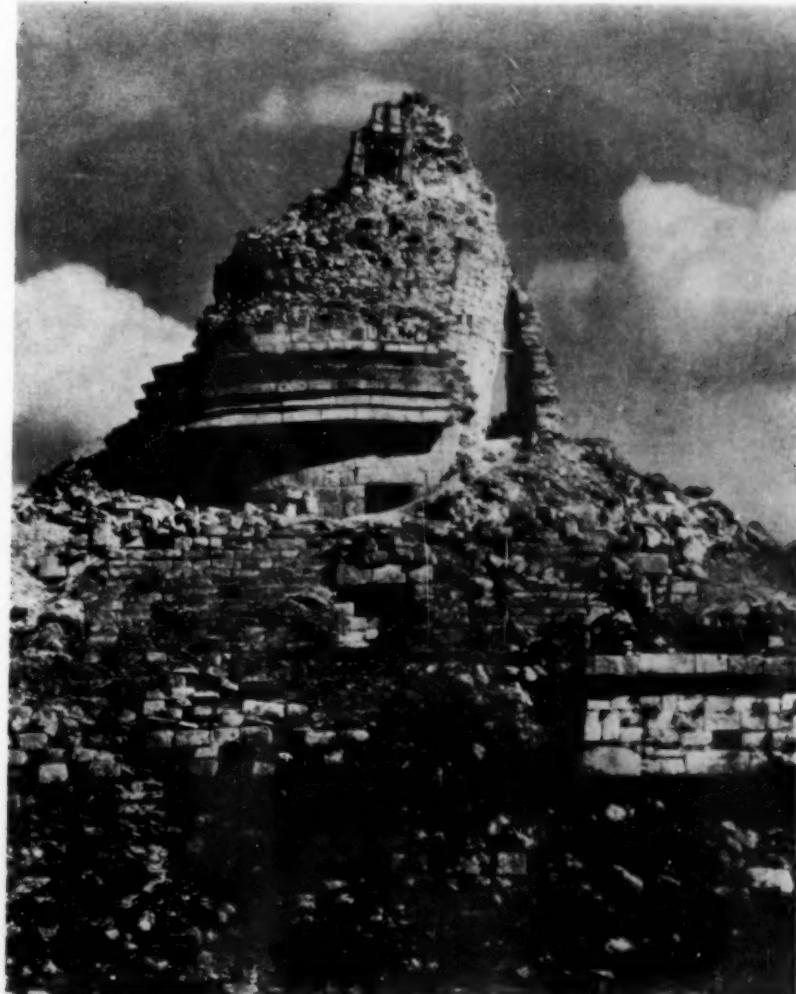


SCIENCE NEWS-Letter

The Weekly Summary of Current Science
A SCIENCE SERVICE PUBLICATION

\$5 a year 15c a copy

June 23, 1928



THE GLORY THAT WAS MAYA

The Ruins of "El Caracol"—"The Snail"

(See page 387)

Vol. XIII

No. 376

Indians Built Mound After White Men

Archaeology

The last traces of the old idea that the mound-builders were a mysterious ancient race who vanished before the coming of the Indians have been very effectually destroyed by the discovery at Joliet, Ill., of a mound filled from bottom to top with the skeletons of buried Indians, each skeleton provided with funeral gifts of European manufacture as well as the more usual stone, bone and shell objects of native workmanship. Prof. Fay-Cooper Cole of the University of Chicago states that so far as he is aware this is the first wholly post-European mound discovered in this country.

The mound is one of the so-called Fisher group, which have been subjected to excavation during the past few years by George Langford, a factory executive of Joliet. The other mounds have yielded Indian relics of pre-European date, one of the cultures represented being very primitive and possibly very ancient. A few articles of white man's manufacture were found near the top of

one of these larger mounds, linking the history of the Indians of this region with that of French Colonial trading in the Mississippi valley.

The mound which Mr. Langford has just finished exploring had been given a somewhat superficial going over by an earlier group of amateur diggers, who found a considerable number of silver objects, including a crucifix, several spoons, bangles, and other ornaments. It was thought that everything had been removed, but when Mr. Langford dug into the mound again he discovered that the previous excavations had done little more than remove the surface. He found burials with European and Colonial funeral gifts throughout the mound and down into the ground to a depth of five feet beneath its base.

The finds include a couple of brass pots in excellent condition, one of them with a close-fitting lid, a pair of scissors, a large number of knives bearing a French trademark, several silver spoons, and quantities of beads, buttons, pins and other

trinkets. Brass seems to have been a favorite metal; every skeleton had some brass object with it. These modern mound-builders unquestionably did a lot of business with the French traders.

One of the most remarkably well-preserved specimens is a combination pocket compass and sun dial in a brass case. The "floating" compass card swings freely on its pivot, the glass cover is unbroken, and the gnomon of the sundial can still be turned on its hinge.

A change in the type of burial may possibly be due to European influence. All the adult skeletons in this post-European mound lay flat on their backs, heads west, feet east. This resembles the white man's method of burial. All the other deep burials at the Fisher site, whose funeral gifts do not include European objects, were turned over on one side and drawn up into a crouching position, as primitive peoples are wont to sleep in cold weather.

Science News-Letter, June 23, 1928

Library Gets Rare Book

Bibliography

One of the rarest books on science—the first edition of Sir Isaac Newton's "Principia," has now been secured by the Library of Congress, after years of search. Though only an inch and a half thick and ten inches high by seven and a half inches wide, with 510 pages, it has been termed "the most important printed work on exact science ever published." It was published in 1687 in London, and in it Newton first gave to the world the results of his fundamental study of the laws of gravitation.

Two issues of the first edition were made in the year of its publication, one being intended for sale in England, and the other on the continent. The Library of Congress copy is of the first issue. However, the entire edition was small and it is related by contemporary writers that as soon as 1691 it was very difficult to obtain.

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SCIENCE NEWS-LETTER, The Weekly Summary of Current Science. Published by Science Service, Inc., the Institution for the Popularization of Science organized under the auspices of the National Academy of Sciences, the National Research Council and the American Association for the Advancement of Science.

Edited by Watson Davis.

Publication Office, 1918 Harford Ave., Baltimore, Md. Editorial and Executive Office, 21st and B Sts., N. W., Washington, D. C. Address all communications to Washington, D. C. Cable address: Scienserve, Washington.

Entered as second class matter October 1, 1926, at the postoffice at Baltimore, Md., under the act of March 3, 1879. Established in mimeographed form March 13, 1922. Title registered as trade-mark, U. S. Patent Office.

Subscription rate—\$5.00 a year postpaid. 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Special reduced subscription rates are available to members of the American Association for the Advancement of Science.

Advertising rates furnished on application.

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Science News-Letter, June 23, 1928

INTERPRETING week by week, the latest developments in the various fields of science, this magazine attempts also to present its articles in the most pleasing and readable topography and the most convenient arrangement.

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All of the resources of Science Service, with its staff of scientific writers and correspondents in centers of research throughout the world, are utilized in the editing of this magazine.

Modern Mayas Treasure Ancient Glories

Archaeology

By EMMA REH STEVENSON

When the first white men, a handful of romantic Spanish wanderlusters, touched on the silvery coastline of Yucatan, soon after the discovery of the New World, the famous old Maya cities were already empty and deserted.

The Indians that the Spaniards met in the "Land of the Pheasant and the Deer" were living in third-rate towns, as compared with older cities such as Chichen Itza or Uxmal. A century before, the last great Maya Empire had fallen to pieces, and when the Spaniards came trees were growing out of the famous temples, and noisy swallows and bats flew through the deserted rooms.

The native race, however, had not forgotten about the good old days, and humble Indians made devout pilgrimages to the old religious centers. The families of their old kings and priests had emigrated from northern Yucatan back into their original homes in Peten, Guatemala, leaving the great middle and lower class behind them. These, "without benefit of clergy," still brought their offerings of copal, rubber and chewing gum to burn in the old ruins. Every year stragglers trudged over long trails through the jungles bringing the most precious things they possessed to throw into the Sacred Cenote at Chichen Itza, that great round hole broken through the limestone crust, far down to a deep, silent subterranean pool.

Although the old religious organization that once held the monopoly of education in the land of the Mayas was no longer functioning, there were still people left in whom the old arts of writing and recording time survived. Many of the mysteries of the Maya civilization that are baffling scientists now, could then have been solved.

The early padres and Conquistadores saw no reason for mastering Maya writing, or the other arts on which they looked down. Neither did they encourage the Indians to hold on to their own culture, for when they beheld the strange synthetic monsters carved of stone and painted in color combinations Europeans never thought of, their impulse was to smash the monstrosities.

The Mayas of those days were probably as likeable folks as they



TWO MODERN MAYA MAIDS, with their hair in a characteristic "xtuch"

are today. The fact is that the first white man who made friends with them, a Spanish sailor, did not want to go back home any more, and lived happily with them for many years. Diego de Landa, second bishop of Yucatan, tells how this Aguilar the sailor married a native lady, adopted Maya customs and dress, and he fears, their "idolatrous practices as well." Thus one of the very first American conversions went in the wrong direction.

But how little the Mayas knew of their own history even 400 years ago is shown by the words of a Colonial observer who explained that "the Indians do not surely know who built the cities nor when they were built, though some did their best in trying to explain the matter, but in so doing showed foolish fancies and dreams."

The fact that the fallen cities were nevertheless still held sacred is indicated by the wording of a colonial

land-deed covering the ground where the beautiful city of Uxmal now stands. In part it reads, "It would prevent the Indians from worshiping the devil in the ancient buildings which are there, having in them idols to which they burn copal, and performing detestable sacrifices, as they are doing openly and publicly."

Although many secrets of the origin and development of the great Maya civilization must have died when its political structure fell to pieces about a century before the discovery of America, and although the coming of a new race and the introduction of a new religion has polluted much of the pure tradition that remained, there is still today a wealth of information in the everyday lives of modern Yucatecans. Human nature outlasts temples, and there is as much to read in living faces as in carved rocks.

The Maya spirit has not been stamped out in Yucatan and replaced by something else, because it was too positive a force to be swept away, but it has interwoven itself into the fabric of a new civilization that may once more bloom on the limestone peninsula that projects into the jade-green sea. It is perfectly proper to be an Indian in Yucatan, and the quiet assurance of the Mayan is a significant contrast to the shivering Aztec with his chin in his serape, on the Central Mexican Plateau, ashamed of his race and language.

As Dr. Manuel Gamio, well-known Mexican archaeologist and sociologist, has pointed out, a truer racial mixture has taken place in Yucatan than on the mainland of Mexico, and one race has not crushed another. As a result, the dormant Maya civilization still lives to a large extent.

In the lower and middle classes Indian blood is strong and traditions are purer, and much could be salvaged today to help the archaeologist who is excavating the ancient cities piece together the tale of the past. There is still a section of Yucatan that has never come under the rule of the Mexican government at all, and there the modern Mayas are probably much as they were at the time of the Conquest. The capital of this region is Santa Cruz, a matter of days on horseback from the eastern end of the Yucatecan railroad at Peto. The Indians are not unfriendly, (*Turn to next page*)

Modern Mayas Treasure Ancient Glories—Continued

but few visitors ever reach Santa Cruz except on official missions for which permission is obtained from the Maya chief, "general" Mai.

But the student can find many relics of old traditions nearer the beaten track as well, and there is as much thrill in coming across some hidden spring of ancient tradition as there would be in finding a white temple in the jungle.

Jean Charlot, official artist of the Carnegie Institution Expedition working at Chichen Itza, during a trip through the brush to other ruined cities in the eastern part of the state, came across many fresh offerings of copal gum on long-forgotten ruins buried by vegetation.

He also tells of playing with a little Maya boy on the American hacienda at Chichen Itza, and pretending to be choking him, he put his hands around the boy's neck and said "I am going to kill you." The boy quickly said, "If you do it will rain," a remark that harked back to the times when it cost a human life to get a little water for the corn crop.

The Maya laborers working with the archaeologists at Chichen Itza did not show the white man's great excitement at the recent finding of the beautiful plaque of inlaid turquoise in the Inner Sanctuary of the Temple of the Warriors, but they were curiously interested in a polished stone ball that came with the find. They said it was a "sastun," an object of great importance in their old religion and which is still used because it is believed to have great magical and curative properties.

Miss Katheryn MacKay, trained nurse attached to the Carnegie Expedition Staff, and who has had many opportunities of getting acquainted with the natives during free clinics which she holds several times a week, tells of rain ceremonies in the nearby villages during which the Mayas cook sacred meals to Chac with water which they get from a sacred cenote.

Don Luis Rosado Vega, director of the Archaeological and Historical Museum at Merida, describes rain ceremonies which are common throughout Yucatan today. He states that the Indians always hold two "parties" for their crops, one when they are sowed and the other when they are reaped, and at both of them they get very drunk and dance.

A diverting picture of a modern Maya Indian looking down into his



MAYA ARCHITECTURE OF TODAY.
A hut built by the people whose ancestors made the great structure shown on the cover

Details that Dr. Herbert Spinden, Harvard University archaeologist, has noted on Maya monuments such as one at Yaxchilan, Chiapas, belonging to the Old Maya Empire, suggest that the styles in dress in vogue in Yucatan today have not changed radically for perhaps a thousand years. Dr. Spinden finds a Maya woman on a carved door lintel dressed in a sacklike garment embroidered all over and especially heavily around the hem, and he believes it may be the prototype of the modern "huipil," that Maya women wear.

Dr. Cook of Fiji Island fame, when he was a young man 165 years ago, tells of the white cotton sack-like garment richly embroidered around the bottom and neck, that the native women wore, a description fitting exactly today. Don Luis Rosado Vega, of the Merida museum, has three stone statues of Maya women in his collections, coming from the state of Campeche, which show embroidered collars that could easily be very like the modern ones the native women wear when they are "dressed up."

The carved door lintel on which Dr. Spinden sees the forerunner of the modern "huipil" of Yucatan, also shows that the curious "xtuch" or knot of hair the women wear on top of their heads in the back was also in good style when Yaxchilan was a fashionable city. The Maya lady who posed there for her picture many centuries ago gathered her hair in a knot at the back of her sugar-loaf shaped head and tied it with a ribbon as the Yucatecan women do today.

own past was given recently by a talkative native who lives on the edge of the brush at Chichen Itza. I was on my way to "Las Monjas," a towering palace of the ancient city, to see the red sun-ball set for the last time in the flat sea of low jungle that stretches as far as one can see.

The path led by his hut and in order to be polite I said "Buenas tardes," and asked if it were the right trail. He was chopping a pole propped on a stump with a curiously shaped machete that had a curl on the end like the nose of the famous "Long Nosed God" on the Temple of the Warriors not far away.

He was in a talkative mood and I stopped to hear how he was going to build his mound of wood in order to produce charcoal. While he illustrated with little twigs and drawings in the dust, I chopped on the pole with the long-nosed machete and his wife came out with the baby on her hip and sat on the other end of the pole.

I asked how he supposed the ancients chopped the hard sapote wood they used for door lintels when they had no metal axes. He replied that they must have had metal because they had bells. I explained that those were of copper and gold and too soft to cut.

He answered that in old times it was easy to do anything, because the king had many slaves, and all he had to do was command. He made a curious sweeping gesture with his hands. And when the king said you had to give your son to be sacrificed, there was nothing else to do, he continued. He asked if I had seen the Cenote de Sacrificios, and the altar in front of it, and the oven underneath where they roasted the heart of the victim after it had been cut out so, and he illustrated. The priests and nobles got a little piece of the roasted heart to eat, he said.

Then he wanted to know if we had Saints in my country and I replied that the "central" god is worshipped more, and the Saints are not so important as in Yucatan. That puzzled him, and he said that the Saints were God's office staff and each had a different job.

"The antiguos only had one god," he remarked. "They worshipped the Sun." He made another sweeping gesture with his arms and his head bent back gracefully and his eyes rolled up as if in adoration. (Turn to page 397)

Sea Animals Hold Cold Light Secret

Biology

Following are reported some of the papers presented at the meeting of the Pacific Division of the American Association for the Advancement of Science with its affiliated societies at Pomona College in California.

Man will face new and important ways of controlling nature when he succeeds in demonstrating the mechanism by which tiny organisms of the sea produce light without appreciable heat, Dr. Charles A. Kofoid, of the University of California, declared in his presidential address before the Pacific Division of the American Association for the Advancement of Science.

Dr. Kofoid described the occasional outbreaks of luminescence in the ocean by night, when each breaking wave is accompanied by an outburst of flaming light, and the path of a vessel becomes an illuminated trail across the water. By day the water of the luminous sea is rusty red, and mottled with patches of color. The luminous outbreak brings death and destruction to tons of sea creatures, and has baffled attempts of scientists to plumb the mystery to its exact source.

The epidemics of light have been definitely traced to tiny sea animals with the long name of *dinoflagellata*, which sometimes develop and multiply with what seems like an astonishing ambition to cover the ocean. But what causes such enormous flares of growth is still to be explained.

The fact that the outbreaks occur so frequently off the Pacific coast of this country, rather than off the Atlantic, is a clue that local conditions of weather and sea geography may play their part in the mob drama of the *dinoflagellata*. Chemical analysis of sea water patiently made over long periods of time is also expected to reveal some evidence of the exact kind of water in which the creatures flourish. It is also possible that the organisms themselves produce some substance which favors their own growth, and that they flourish and multiply until the food supply becomes inadequate and then the surplus hordes starve.

The task of handling and experimenting with these delicate organisms is extraordinarily difficult, Dr. Kofoid said, because they are attuned to an environment of great constancy, and the changes in their environment which cause them to respond are slight compared with other creatures of the animal world.

"The secret of the production of

light without appreciable heat is locked up in the metabolism of these simple organisms of the sea," Dr. Kofoid said in conclusion, pointing out that some of the most inviting problems of biology are involved in understanding the relations of these organisms to the solar radiations on which they depend and in demonstrating the mechanism by which they release their stored-up reserves of energy.

Size of Pollen Influences Growth

Whether or not flowers will reproduce may be traced to the size and general appearance of the pollen grains, reported Miss Laura E. Shaw, of the University of Southern California. She separated pollen grains into four groups according to size and found that the third group, containing grains of from three to four-thousandths of an inch and comprising half of the grains studied, gave the highest percentage of germination, the rate being 75 to 80 per cent.

Burrowing Prehistoric

Gophers, or their ancestors of the Stone Age, cultivated the habit of burrowing assiduously, finding it a great help in the struggle for existence, E. C. O'Roke, University of California investigator, reported. This habit was developed by many different orders of mammals, particularly those belonging to the rodent family, no matter how wide their zoogeographical distribution.

Sunspots Now on Wane

Astronomy

Spots on the sun, supposed to be connected with magnetic storms and Northern Light displays on the earth, and which have been especially numerous in the last few years, have now begun to decrease in numbers. They wax and wane in a regular cycle and the maximum was reached about March, 1927. This announcement was made by R. S. Richardson, of Los Angeles.

This maximum came unusually soon, it was stated. Though there is an average interval of about eleven years between two times of most spots, the 1927 maximum happened only 7.3 years after the last maximum at the end of 1919. Only once

in the last hundred years has the interval been so short. That was nearly a century ago, when maxima happened in 1829 and 1837, a little more than seven years apart. The present waning cycle, despite the fact that large spots were seen unusually soon, shows signs that the total number of spots in it will be unusually small.

Studies Sunburn Rays

The numbers of spots on the sun are now decreasing, and with them will decrease the amount of ultra-violet rays in the sun's light. These are the rays that cause sunburn in large quantities, and cure rickets and other diseases when the body is exposed to less of them.

Studies made at the Mt. Wilson Observatory during the last four years show that the intensity of the ultra-violet rays, and the numbers of the sun spots are in striking agreement, said Dr. Edison Pettit. His measurements were made by comparing the amount of sunlight transmitted through a filter of thin gold to that through a similar silver filter. In certain months, the average ultra-violet radiation from the sun was fifty per cent. greater than in other months.

Sun Has Eye Lotion Element

The element boron, principal constituent of borax and boric acid, is also present in the sun, the astronomers were told by Dr. Seth B. Nicholson of the Mt. Wilson Observatory.

Dr. Nicholson, who in 1914 won himself a place in astronomical history when he discovered a previously unknown moon of the planet Jupiter, has been working with Nicolas Perakis on a study of the sun. This has been by means of the spectroscope, which analyzes the sunlight into the colored spectrum band, crossed by dark lines that reveal the solar elements causing them.

Hitherto none of the spectral lines given by boron when studied on the earth have been identified in the sun. However, when boron compounds, in which the element is associated chemically with other elements, are examined with the spectroscope, characteristic bands in the spectrum result. Dr. Nicholson and his associate have found these bands (*Turn to next page*)

Pacific Division A. A. A. S. Meeting—Continued

in the spectra of light from sun spots. Though these spots appear dark, they do so only by contrast with the brighter portions of the sun. They are really very bright themselves.

Dr. Nicholson pointed out that nitrogen and carbon, two elements which are very similar to boron chemically, have only been located in the sun by means of the band spectra of their compounds.

Flames 20,000 Miles a Minute

Solar "flames," or prominences, that move out from the sun with speeds as great as 20,000 miles a minute, were described by Ferdinand Ellerman, of the Mt. Wilson Observatory,

These prominences have been studied by means of the spectroheliograph, an instrument that permits them to be photographed in the light of a single color. They consist largely of hydrogen. Among the interesting ones that he has studied recently, Mr. Ellerman told of one that expanded from a height of 100,000 miles above the sun's surface to more than 200,000 miles a few minutes later.

Tests Sunburn Sensitivity

Physics

Whether or not you sunburn easily may now be tested in a doctor's office without going to the seashore. Dr. Robert C. Burt, of Pasadena, told of a new instrument that he has invented and calls the "erythemeter." It measures sensitivity of a person to erythema, as the physician terms painful sunburn.

Erythema, or sunburn, is caused by the ultra-violet rays in the sun's light. It can also be caused by ultra-violet light from a quartz tube mercury vapor lamp, or one of the other forms of lamp now being used in the treatment of rickets and other diseases. In Dr. Burt's instrument such a quartz lamp is contained in a light-tight box from which the ultra-violet rays can escape through a hole about two inches square. This opening is placed directly against the bare skin of the person being tested.

A set of filters in back of this hole cuts off more and more of the rays so that the skin at one edge gets the full benefit of the rays from the lamp, while that at the opposite edge receives none. After being exposed to this apparatus for ten minutes, the untanned skin of anyone becomes burned at the side receiving the most

rays. The distance that the burned area spreads measures the person's sensitivity.

As it is also desirable to measure the effect of varying exposures on sun-burning, a shutter is provided behind the opening also. This moves across the hole in a direction at right angles to that at which the intensity varies. When the exposure is complete it has moved completely across. The result is an actual curve drawn on the subject's skin which shows how long an exposure he can stand to ultra-violet rays of any intensity.

The instrument is expected to be useful to physicians who are now using ultra-violet rays in the treatment of disease. Over exposure of a sensitive person to them may be very harmful, and by making a test with such an instrument serious effects can be prevented.

Dr. Burt also described another instrument of his invention that measures intensity of ultra-violet light, either from the sun, or an artificial source. It makes use of a photoelectric cell, in which light is converted to electricity, but a cell made of quartz, instead of glass, which is opaque to the rays.

"The instrument is so portable and easy to use," says Dr. Burt, "that the day may come when up-to-date bathing beaches will have an observatory giving out the intensity of the sunburn light in the sun, so that each person may stay out just long enough to become a delicate brown without becoming severely burned."

Thunderstorms in March

Meteorology

California, particularly along the coast, has the reputation of immunity from severe electrical storms. However, they do occur, and during the last few years several large oil storage tanks have been ignited by lightning. Dr. Charles C. Conroy told the members of the meteorological section.

March is by far the month in which they are most frequent, he said. Then follow April, January, February and May. The least number are in December, with November and October next in freedom from them. A number also happen in late August and September. He has also studied the time of day that they occur, and has found that in Los Angeles most are between two and three in the

afternoon, the warmest part of the day in winter and spring. Different years rate quite differently in numbers. Eighteen were recorded in Los Angeles in 1918-19, but from January, 1914, to September, 1916, none were noticed. Practically all of the storms studied were mild, and only three or four really severe. Some that were mild in the downtown district, however, did considerable damage in nearby mountain or foothill districts.

Ocean Maps Aid Long Forecasts

Weather maps now made by San Francisco Weather Bureau officials, covering the Pacific Ocean as far as the Aleutian Islands and the Philippines may aid in long-range weather forecasts of the California region and the Western United States. So the members were informed by L. E. Blochman, of Berkeley.

In general, said Mr. Blochman, seasons tend to follow the conditions prevailing during October and November, when the California rainy season opens. Sometimes, however, as happened last season, they change. He believes that study of the low pressure area around the Aleutian Islands is of considerable importance.

Science News-Letter, June 23, 1928.

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"Artificial Skies" Show Southern Stars

Astronomy

As the fliers of the Southern Cross winged their way southwards over the Pacific at night, the familiar stars of our skies dropped behind the northern horizon. In their place there arose in the south constellations we never see, including the original Southern Cross, after which their plane is named.

By this time next year, Chicagoans will be able to see this effect themselves without leaving their city. Then there will be in operation the first planetarium in the western hemisphere. This is a remarkable German optical device, which portrays, on a white dome, the stars and planets as seen from any part of the earth at any time. Max Adler, former Sears-Roebuck official, has just given \$500,000 to the city for one of these instruments and the building to house it. An island in Lake Michigan, near the Field Museum, has been selected as the site.

Mr. Adler will shortly leave for Germany to study the instrument at Jena, home of the Carl Zeiss Optical Works where it is built, as well as other German cities, and will personally supervise its erection in Chicago.

With the vanguard of the thousands of American tourists who will visit Germany during the coming months now reaching Berlin, the planetarium there is attracting large crowds.

Since the first planetarium was erected in 1924 in Jena, on the roof of one of the buildings of the Zeiss works, fourteen other German cities have installed them, including Munich, Berlin, Hamburg, Hanover, Düsseldorf, Barmen, Leipzig, Stuttgart, Nürnberg and Mannheim. One has been installed in Vienna; Mussolini has ordered one for Rome, which will be opened this fall; while the Soviet government has also ordered one for Moscow, paying cash in advance.

The planetarium is a huge instrument, consisting of a long cylinder, with two spherical ends. Imbedded in the spheres, and also along the cylindrical parts, are a number of lenses, 119 in all. These act as magic lanterns to project the images of the naked eye stars, the Milky Way, the Sun, Moon and planets on the white cloth-lined dome. So rea-

listic is the effect that when the room is darkened and the visitor has become used to the dim light, the stars appear as in the actual night sky. The visitor does not seem to be in a 90 foot dome, but under the stars themselves on a cloudless night.

The mechanism of the machine, all controlled by the lecturer from a single switchboard, will enable it to reveal the stars as seen from the north pole, the south pole, or any place between. The "great year," of 26,000 ordinary years, can be duplicated in a few minutes, and the heavens shown as they appeared thousands of years ago. Five thousand years ago our present pole-star was not in that prominent position, but it was occupied by the star we call alpha Draconis. At that time also, the Southern Cross was visible from the present latitude of New York. This can be shown with the planetarium. When desired, the names of the constellations can be flashed on the sky in the proper places, as if on huge electric signs!

The phases of the moon as it spins around the sun, along with the earth, are dis- (Turn to next page)

Buildings Burned to Test Safes

Engineering

Two buildings, one five stories high, in the heart of Washington, and within less than a mile of the White House, were burned to the ground early Sunday morning, June 17, while firemen stood by and watched. No effort was made to save the buildings, though they contained large amounts of lumber and other material, as well as 35 safes filled with records. The fire was started by S. H. Ingberg, Bureau of Standards scientist, but, although police were present, no effort was made to arrest him for arson.

This unusual fire was made as a scientific experiment, part of a series made by the fire protection section of the Bureau of Standards, of which Mr. Ingberg is in charge. Previous tests have been made in a large concrete chamber of the bureau, but never before has it been possible to make a careful study of conditions at a full-size fire, for which preparation had been made months in advance.

With the demolition of many old

buildings in Washington, in the triangle south of Pennsylvania Avenue, in order to make way for the government's extensive building program, the idea was conceived of burning one or more as an experiment. Thus the expense and trouble of wrecking them by the ordinary means was saved, and at the same time data of great value to manufacturers of safes, engineers, and architects have been obtained.

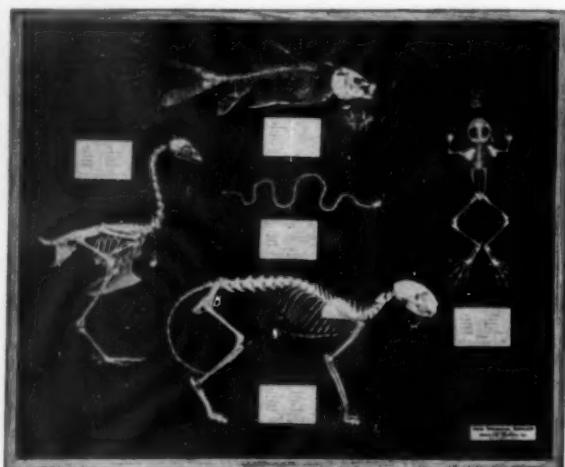
The two buildings were at 1007 and 1009 Little B Street, opposite the north side of the National Museum, and between the Capitol and the White House. One was two stories high, 22 feet wide and 75 feet deep, while the other was five stories high and 30 by 75 feet deep. Both had brick walls, and open joisted wood floors, about an inch thick, and very few partitions. The elevator shafts were open and the stairways inadequately protected. According to the Bureau officials they were typical of the non-fire resistive type of structure built some years ago, and still very

common in American cities. Until last fall they had been used as warehouses.

All the surrounding buildings had been completely demolished several months ago. The two under test were loaded with waste lumber and such material, the weights varying from $7\frac{1}{2}$ to 30 pounds per square foot of floor area. Thirty-five safes, submitted by various manufacturers, were placed at different locations in the buildings. These were numbered inside the doors to permit of identification. They were filled with useless records, so as to determine the degree of protection that they afforded. Each safe also contained a thermometer to record the highest temperature within during the fire, and a clock arranged to stop with a heavy jar. These give records of the time at which each safe fell through the burned-out floor to the ground below.

Mr. Ingberg and his associates observed the fire from a "dugout" in an old boiler room nearby. By means of thermocouples (Turn to next page)

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Planetarium—Continued

played. So are the motions of the planets. These can be speeded up so that the events of a year take place in a few seconds. The sun speeds across the dome with Mercury and Venus looping around it. The alternate forward and backward motion of Jupiter and Saturn, hardly visible in reality because of their slowness, become immediately apparent. Yet so accurate is the mechanism, that if the planets are shown as they will appear 5,000 years hence, Mercury, the fastest moving of them, is out of its proper place less than the diameter of the full moon.

Most of the German planetariums are operated by the school boards of the respective cities, but for general visitors, an admission charge of one mark is usually made. Despite this, the popularity of them has been so great that in the four years since the first one more than a million paid admissions have been recorded in Germany. This has gone far towards paying the cost. The instrument itself sells for about \$40,000, and the cost of the building is from about \$150,000 upwards.

Science News-Letter, June 23, 1928

The Emigrant

Cosmogony

LUCIO, in Manchester (England),
Guardian Weekly:

"A simple proof of it (i. e., the drift of the earth's great continental masses) is to compare the eastern shape of the two American continents with that of the European and African shores of the Atlantic. The two will be found to fit into each other like the dovetail-work of a joiner, promontory into gulf and gulf into promontory, showing that at some remote geological period the Americas and the Old World formed a single land mass from which the double American continent has drifted away."—From a news article of the week.]

At school they used to blame Lord North
For lost Amerikey;
He drove, they said, the settlers forth
Determined to be free.
But, lo! the breach was not evolved
From any British shift—
Their land had long before resolved
To cut itself adrift.

And, why should it have crossed the foam
And steadily gone West?
If it had quietly stayed at home
It had been for the best;
No quarrels had been then unmasked,
All neighbours we should be,
And any time we might have asked
"Bill" Thompson in to tea!

We should not then have had to learn
Our slang from books or plays—
We should have grasped its newest
turn

In daily talk and phrase,
For Coney Island and its shows
Would be as near as France—
And little old Noo York, I s'pose,
A suburb of Penzance.

We might have sat all movies through
And found no point to vex,
For nothing Hollywood could do
Would baffle or perplex;
The lingo and the manners then
Had been at our command,
If we had all been fellow-men
In one united land.

Ah me! what consequences flow
From that disastrous day
When both Americas let go
And slowly sailed away!
With what dissensions newly stirred,
That fatal day was packed
When history's biggest split occurred
And half the globe went cracked!

Fire Test—Continued

placed in open spaces at 50 advantageous points within the burning buildings, and at 45 points in the debris, connected by wires with instruments in the dugout, the temperatures were measured electrically.

Only newspaper men, firemen and policemen and others immediately concerned with the work were admitted. As the fire was started at 5.30 A. M., most Washingtonians were still asleep while it was taking place, and did not learn of it until it was over. The alarm had been received by the fire department long before it started, so companies, with apparatus, were stationed at several points near the National Museum, the Postoffice Department Building, and other nearby structures to prevent any possibility of other fires being started by burning brands.

An estimated maximum temperature of 3600° F. was reached at the height of the fire. As no water was put on, temperatures as high as 2000° F. were recorded 12 hours after the fire was started.

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CLASSICS OF SCIENCE:

Dalton's Atomic Theory

Chemistry

Note that the theory of atoms resulted from the study of gases and their laws, and led to the investigation of the combining weights of the elements.

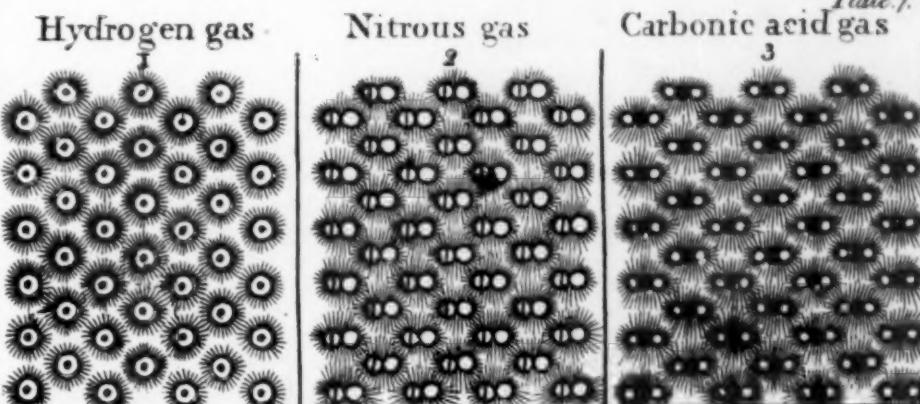
A NEW SYSTEM OF CHEMICAL PHILOSOPHY. By John Dalton. Manchester. Part I, published in 1808, Part II in 1810.

The Constitution of Bodies

There are three distinction in the kinds of bodies, or three states, which have more especially claimed the attention of philosophical chemists, namely, those which are marked by the terms *elastic fluids*, *liquids*, and *solids*. A very familiar instance is exhibited to us in water, of a body, which, in certain circumstances, is capable of assuming all the three states. In steam we recognize a perfectly elastic fluid, in water, a perfect liquid, and in ice a complete solid. These observations have tacitly led to the conclusion which seems universally adopted, that all bodies of sensible magnitude, whether liquid or solid, are constituted of a vast number of extremely small particles, or atoms of matter bound together by a force of attraction, which is more or less powerful according to circumstances, and which as it endeavours to prevent their separation, is very properly called in that view, *attraction of cohesion*; but as it collects them from a dispersed state (as from steam into water) it is called, *attraction of aggregation*, or more simply, *affinity*. Whatever names it may go by, they still signify one and the same power. It is not my design to call in question this conclusion, which appears completely satisfactory; but to show that we have hitherto made no use of it, and that the consequence of the neglect has been a very obscure view of chemical agency, which is daily growing more so in proportion to the new lights attempted to be thrown upon it.

The opinions I more particularly allude to, are those of Berthollet on the Laws of chemical affinity; such as that chemical agency is proportional to the mass, and that in all chemical unions, these exist insensible gradations in the proportions of the constituent principles. The inconsistence of these opinions, both with reason and observation, cannot, I think, fail to strike every one who takes a proper view of the phenomena.

Whether the ultimate particles of a body, such as water, are alike, that is,



DALTON'S SCHEME FOR REPRESENTING ATOMS

of the same figure, weight, etc., is a question of some importance. From what is known, we have no reason to apprehend a diversity in these particulars; if it does exist in water, it must equally exist in the elements constituting water, namely, hydrogen and oxygen. Now it is scarcely possible to conceive how the aggregates of dissimilar particles should be so uniformly the same. If some of the particles of water were heavier than others, if a parcel of the liquid on any occasion were constituted principally of these heavier particles, it must be supposed to affect the specific gravity of the mass, a circumstance not known. Similar observations may be made on other substances. Therefore we may conclude that *the ultimate particles of all homogeneous bodies are perfectly alike in weight, figure, etc.* In other words, every particle of water is like every other particle of water; every particle of hydrogen is like every other particle of hydrogen, etc.

Besides the force of attraction, which, in one character or another, belongs universally to ponderable bodies, we find another force that is likewise universal, or acts upon all matter which comes under our cognisance, namely, a force of repulsion. This is now generally, and I think properly, ascribed to the agency of heat. An atmosphere of this subtle fluid constantly surrounds the atoms of all bodies, and prevents them from being drawn into actual contact. This appears to be satisfactorily proved by the observation, that the bulk of a body may be diminished by abstracting some of its heat: But from what

has been stated in the last section, it should seem that enlargement and diminution of bulk depend perhaps more on the arrangement than on the size of the ultimate particles. Be this as it may, we cannot avoid inferring from the preceding doctrine on heat, and particularly from the section on the natural zero of temperature, that solid bodies, such as ice, contain a large portion, perhaps $\frac{4}{5}$ of the heat which the same are found to contain in an elastic state, as steam.

Mixed Elastic Fluids

When two or more elastic fluids, whose particles do not unite chemically upon mixture, are brought together, one measure of each, they occupy the space of two measures, but become uniformly diffused through each other, and remain so, whatever may be their specific gravities. The fact admits of no doubt; but explanations have been given in various ways, and none of them completely satisfactory. As the subject is one of primary importance in forming a system of chemical principles, we must enter somewhat more fully into the discussion.

Dr. Priestley was one of the earliest to notice the fact: it naturally struck him with surprise, that two elastic fluids, having apparently no affinity for each other, should not arrange themselves according to their specific gravities, as liquids do in like circumstances. Though he found this was not the case after the elastic fluids had once been thoroughly mixed, yet he suggests it as probable, that if two of such fluids could be exposed to each (*Turn to next page*)

Dalton's Atomic Theory—Continued

other without agitation, the one specifically heavier would retain its lower situation. He does not so much as hint at such gases being retained in a mixed state by affinity. With regard to his suggestion of two gases being carefully exposed to each other without agitation, I made a series of experiments expressly to determine the question, the results of which are given in the *Manch. Memoirs*, Vol. 1, *new series*. From these it seems to be decided that gases always intermingle and gradually diffuse themselves amongst each other, if exposed ever so carefully; but it requires a considerable time to produce a complete intermixture, when the surface of communication is small. This time may vary from a minute to a day or more, according to the quantity of the gases and the freedom of communication.

These and other considerations which occurred to me some years ago were sufficient to make me altogether abandon the hypothesis of air dissolving water, and to explain the phenomena some other way, or to acknowledge they were inexplicable. In the autumn of 1801, I hit upon an idea which seemed to be exactly calculated to explain the phenomena of vapour; it gave rise to a great variety of experiments upon which a series of essays were founded, which were read before the Literary and Philosophical Society of Manchester, and published in the 5th Vol. of their memoirs, 1802.

The distinguishing feature of the new theory was, that the particles of one gas are not elastic or repulsive in regard to the particles of another gas, but only to the particles of their own kind. Consequently, when a vessel contains a mixture of two such elastic fluids, each acts independently upon the vessel, with its proper elasticity, just as if the other were absent, whilst no mutual action between the fluids themselves is observed. This position most effectually provided for the existence of vapour of any temperature in the atmosphere, because it could have nothing but its own weight to support; and it was perfectly obvious why neither more nor less vapour could exist in air of extreme moisture, than in a vacuum of the same temperature. So far then the great object of the theory was attained. The law of the condensation of vapour in the atmosphere by cold was evidently the same on this scheme as that of the condensation of pure

steam, and experience was found to confirm the conclusion at all temperatures. The only thing now wanting to completely establish the independent existence of aqueous vapour in the atmosphere, was the conformity of other liquids to water, in regard to the diffusion and condensation of their vapour. This was found to take place in several liquids, and particularly in sulphuric ether, one which was most likely to show any anomaly to advantage if it existed, on account of the great change of expansibility in its vapour at ordinary temperatures. The existence of vapour in the atmosphere and its occasional condensation were thus accounted for; but another question remained, how does it rise from a surface of water subject to the pressure of the atmosphere? The consideration of this made no part of the essays above mentioned, it being apprehended, that if the other two points could be obtained by any theory, this third, too, would, in the sequel, be accomplished.

Suppose there were no aqueous atmosphere around the earth, only an azotic one=23 inches of mercury, and an oxygenous one=6 inches. The air being thus perfectly dry, evaporation would commence with great speed. The vapour first formed being constantly urged to ascend by that below, and as constantly resisted by the air, must, in the first instance, dilate the other two atmospheres; (for, the ascending steam adds its force to the upward elasticity of the two gases, and in part alleviates their pressure, the necessary consequence of which is dilatation.) At last when all the vapour has ascended, that the temperature will admit of, the aqueous atmosphere attains an equilibrium; it no longer presses upon the other two, but upon the earth; the others return to their original density and pressure throughout. In this case, it is true, there would not be any augmentation of volume when aqueous vapour was combined with the air; humidity would increase the weight of the congregated atmospheres, but diminish their specific gravity under a given pressure.

On Chemical Synthesis

When any body exists in the elastic state, its ultimate particles are separated from each other to a much greater distance than in any other state; each particle occupies the centre of a comparatively large sphere, and supports its dignity by

keeping all the rest, which by their gravity, or otherwise, are disposed to encroach upon it, at a respectful distance. When we attempt to conceive the *number* of particles in an atmosphere, it is somewhat like attempting to conceive the number of stars in the universe; we are confounded with the thought. But if we limit the subject, by taking a given volume of any gas, we seem persuaded that, let the divisions be ever so minute, the number of particles must be finite; just as in a given space of the universe, the number of stars and planets cannot be infinite.

Chemical analysis and synthesis go no farther than to the separation of particles one from another, and to their reunion. No new creation or destruction of matter is within the reach of chemical agency. We might as well attempt to introduce a new planet into the solar system, or to annihilate one already in existence as to create or destroy a particle of hydrogen. All the changes we can produce consist in separating particles that are in a state of cohesion or combination, and joining those that were previously at a distance.

John Dalton was born September 6, 1766, at Eaglesfield in Cumberland, England, and died July 27, 1844, in Manchester. He opened a school for younger children when he was twelve years old, and became a regular instructor in a school at Kendal when he was 15. In 1787, at the age of 20, he began a meteorological diary which he kept for 57 years. In 1794 Dalton published "Extraordinary facts relating to the vision of colours," in which he described for the first time the condition of color-blindness, with which he was afflicted. Color-blindness was long known as Daltonism. The atomic theory, with which his name is chiefly associated, was first announced in 1802, when its author was 37 years old.

Science News-Letter, June 23, 1928

Suitable landing fields for ambulance airplanes are a problem that is gaining attention.

In the South Seas coconuts have many uses: the milk is drunk; the sap of the tree, boiled and fermented, makes palm wine; the fruit is eaten; leaves make roof thatch for huts; the splints make baskets; the coconut shells are useful dishes; and the oil is used for rubbing the body.

A large lake in Arkansas is said to have an underground connection with the Mississippi River, since its waters rise and fall with the rise and fall of the river.

Experts Warned Against Nobile Flight

Aviation—Exploration

General Nobile's airship "Italia," now down in the Arctic, was too small and slow for serious arctic exploration, and German authorities warned him against using it. This is the opinion of Dr. Walter Bruns, general secretary of the International Society for the Exploration of the Polar Regions by means of the Airship, generally known as "Aeroarctic." The society is particularly interested, as several of its members are with the Nobile expedition. Also, Aeroarctic is itself planning extensive polar explorations next year in the LZ 127, the gigantic Zeppelin now nearing completion at Friedrichshafen. This ship is six times as large as the Italia, and even larger than the American Los Angeles.

"In spite of its great sympathy towards the undertaking," said Dr. Bruns, "the Aeroarctic has had, from the very beginning, serious concern regarding the Expedition. It was pointed out to Nobile that, after the wonderful flight of the sister ship 'Norge,' too distant a goal for a new expedition this year should, before all things, be avoided for this very small type of airship. We know from our Berlin conferences with General Nobile that, because of the small size of the airship, the mass of the necessary reserves of ballast (in case the ship were covered with ice), and the

polar equipment requisite for a possible forced landing, had to be reduced greatly on account of the great distance.

The small speed (about 53 miles per hour) of the airship required that General Nobile spend the month of April and the first half of May, the most precious time for polar work, awaiting favorable meteorological conditions. Already the flight to Nicholas II Land (Lening-land) had demonstrated that it was really too late for further undertakings because of the prevalence of summer fogs. In addition to the unpromising meteorological conditions, General Nobile had to fix the base of his operations at Kings Bay in the Arctic itself, owing to the small radius of action of his airship. This again made him not only dependent upon the general weather conditions but also upon the local storm phenomena (winds, snowstorms, etc.) which are often very troublesome. The snow even penetrated the hangar and made it very inconvenient for the airship in its shelter.

The very favorable flight to the Pole justified the hope that the return trip would likewise be propitious. Under good weather conditions, the journey from Kings Bay to the Pole and back is no great undertaking for an airship. This, however, is not the case, in view of

the small speed of the Italia, as soon as a moderately strong contrary wind arises, as apparently took place on the return trip. That General Nobile on approaching Spitzbergen met with strong adverse winds is, from a meteorological standpoint, not strange, since the region of Spitzbergen is in the area of storm paths which take their course from the North Atlantic along the Norwegian Coast and only gradually die out in the inner Arctic, i. e., become less dangerous for flights.

"Our Society has therefore, as is generally known, held firmly to the opinion that the solution of arctic problems should not be attempted with too small an airship. In order to be independent of especially unfavorable storm conditions of Spitzbergen, one should, before all else, establish his base for arctic exploration as far distant as possible from the Arctic. For this reason we plan for next year's expeditions, anchorages in Leningrad, and perhaps at Murmansk in Kola, and at Nome in Alaska. We wish also, in spite of the very great cruising radius of the new Zeppelin-airship which may be three times that of the 'Italia,' to establish anchorages on both sides of the Arctic in order to be approximately independent of meteorological factors during our journeys covering several days."

Science News-Letter, June 23, 1928

Swords of Northmen Found

Archaeology

Elaborately engraved bronze swords and other rare relics estimated to be 3,000 years old or older have been unearthed on the Swedish island of Oeland in the Baltic Sea by the archaeologist, K. A. Gustawsson, and his associates. The excavations have covered a period of many months. Expenses of the expedition have been met by the Swedish Academy of Antiquities.

The most remarkable find comprises 300 ancient graves covering a very large area. Many of these have the appearance of the so-called "judge-seats," found in various places in Sweden, which seems to indicate that these stone relics had nothing to do with the dispensation of justice in

olden times, but were in fact parts of the Viking's burial grounds.

The scientists are surprised at the length of some of these interment fields. One of them measures 3,281 feet. It is thought possible that the cemeteries borrowed their form from the island, which is narrow and long in shape.

The most magnificent stone mound from the bronze age is the one discovered north of the city of Borgholm. On account of its dominant position, overlooking the Koepings Bay, it is supposed that it must at one time have served as a landmark for sailors. Many of the stone mounds from this time are, in fact, claimed to have filled the same purpose.

Science News-Letter, June 23, 1928

Photograph for Bull's-Eye

Invention

The latest modification of the favorite pastime of American amusement parks — the "hit-the-nigger-and-get-a-cigar"—has just been patented in France by A. Dufour, and rewards the winner with a flashlight photograph of himself winning the prize. The darkly-complexioned victim is replaced by an effigy holding the cigar in his mouth, and the contestant tries to hit the cigar with a rubber ball. If he succeeds an automatic camera and flashlight is set off, and the winner receives the photograph.

Science News-Letter, June 23, 1928

Physicians of ancient times noted that an attack of some contagious diseases protected the patient against another attack.

The Death of a World

Physics

Dr. Paul R. Heyl in *The Scientific Monthly* (June, 1928):

Of the vast collection of astronomical photographs at the Harvard Observatory only a fraction has as yet been examined; but the examination has gone far enough to bring out some rather startling facts concerning those bodies known as new stars or novas which appear every now and then. All of us have heard or read of them; some of us may have seen that brilliant one which appeared in Perseus over twenty-five years ago or that other which was visible about seventeen years later. A star previously unnoticed, of telescopic magnitude only, blazes up within a few hours to a brilliance perhaps exceeding Sirius or equal to Venus at her greatest brightness. Then it slowly fades away. Within the last thirty years one or two occurrences of this kind have happened with attendant phenomena which give us an idea of what may have taken place. The star, moving rapidly through space, as all stars do, including our sun, may have encountered something; perhaps one of those patches of dark nebulous matter with which space is strewn here and there, as dangerous as icebergs on steamship lines of travel.

Many of these dark patches can be recognized by their edges, sharply defined against the starry background surrounding them. If a star happens to plow its way through such a patch of material there will be temporarily a great increase in its surface temperature and a consequent disturbance of the star's internal economy, resulting possibly in an explosion. We are not clear as to just what happens, but from whatever cause the records of the Harvard Observatory show that it happens a good deal oftener than we have ever thought or like to think about. While it is not a matter of daily occurrence, it does happen about once in every three weeks; fifteen times a year there is a nova of at least telescopic magnitude; fifteen hundred such occurrences in a century.

We do not need to go farther back than the period of recorded human history to reach a number of such catastrophes as great as the total number of visible stars. The conclusion, as stated by Professor Russell, is that on the average every star in the heavens must suffer this fate more than once in its lifetime!

Now life has been on this earth for at least a million centuries, and in

that time there must have been a staggering number of such calamities; yet our sun has escaped. Did he suffer this fate before life appeared on the earth, or is his turn yet to come?

We do not know. There is nothing in sight to excite alarm. Our sun seems to be moving through an unusually dust-free region of space. Is it permissible for a scientific man to dream that the way has been swept for him?

The mind can not avoid speculating on what might have happened if only one of the many stars which have suffered this fate had a planetary retinue in attendance. What if there had been life on one of those planets?

It might have been. It may be happening somewhere at this moment, and the light-borne news may not reach us for a hundred years. Nature is icily indifferent to such a circumstance. It is of no moment whatever to her that there may be a planet attached to that sun which suffers his baptism of fire. There might even have been on such a planet sentient beings who lived and loved and liked life well, as we do.

Science News-Letter, June 23, 1928

The Irrigation Fallacy

Agriculture

ISAIAH BOWMAN, Director of the American Geological Society, in *Foreign Affairs*:

One commonly held economic fallacy which ought to be destroyed in order to clear the way for sounder thinking as to the possibilities of development of the pioneer belts of the world relates to the magic of irrigation. The wealth of the irrigated lands of the world—India, Mesopotamia, Egypt, Spain and even of our own country—has been borne in upon us with such insistence that we attribute to engineering skill the ability to transform the deserts of the world into productive gardens. If this were true we should pursue an easier course if we left the mid-zone of the pioneer lands where normal agriculture and grazing may be prosecuted and go at full stride into the desert. Unfortunately, nature takes heavy toll of man's partial or conditional "conquests," so-called, whether it be by desert irrigation or tropical agricul-

ture. Man can throw a railway across the mountain, but every ton of freight that he carries across the mountain takes so much more coal because of the heavy grades; and the price of the coal is the toll that man pays to the mountain. It is the same with irrigation. We have had an admirable laboratory test in the United States. The Reclamation Service has been in existence for twenty-five years. It has done constructive work in providing water for valley floors and benchlands in selected places in the arid West. It has developed irrigation projects where water has been stored and where the settler has been invited to come in under terms regarded as generous. The government has thus tackled directly the problem of the population capacity of the land. Yet what has been the result? In twenty-five years how many people have we actually taken care of? The total farming population upon the twenty-four national irrigation proj-

ects of the West after twenty-five years of government aid and generosity is but 137,000, a population equal to that of the city of Hartford, Conn., or Grand Rapids, Mich. Irrigation alone will not solve questions of general overpopulation or the much deplored cityward movement. It is easy to see that the most trifling improvement of agricultural practice in settled communities will accomplish much more in the production of agricultural products and the growth of population than all the millions that have been poured out upon the irrigation projects of the West in a quarter of a century.

Science News-Letter, June 23, 1928

* Archaeologists have been working in Cyprus for more than 50 years, but it has remained for a peasant to discover broken fragments of a bronze statue which, when reassembled, promises to be the finest single work of art found on the island.

Gypsies of Hindu Origin

Ethnology

Gypsies are on the wing in their motor caravans again, migrating chiefly northward for the summer and just as hard for scientists to track and study as any rare migrating birds.

It seems likely that the real gypsy race is slowly on the road to extinction, according to Dr. Walter Hough, anthropologist of the U. S. National Museum, who has long been interested in these elusive wanderers. The clearing of forests and the broader settlement of this country leave fewer peaceful havens for gypsy encampments. Horse trading and tinkering are not good twentieth century business projects. Gypsy fortune telling must compete now with forms of popular psychology, character reading, astrology and other more learned-looking methods of dickering with the future, although the gypsies are shrewdly taking on some of this learned patter.

But scientists have learned and deduced some facts about the gypsies and their mysterious ancestry before it is too late.

"More than 100 years ago, a student of comparative languages showed that the gypsies are originally from India," said Dr. Hough. "They came to Europe in the middle ages by way of Egypt. When any one asked where they were from they said, from Egypt, and they still claim Egypt as their native land. But many signs point to their Hindu origin."

A camp of pure blood gypsies, such as are rarely seen nowadays, would reveal tawny, lithe men with

expressive faces, black eyes and hair and clean cut features, a real Hindu type, Dr. Hough points out. Then, too, the gypsy maiden's love of finery betrays the oriental strain. The gypsy dances suggest the oriental freedom and postures. Gypsy love of horses no doubt was brought from the hills of India, the anthropologist also believes, for it is known that when the gypsies emerged into Europe they had fine animals and plenty of money, and they have always been connoisseurs of horses and dogs.

A few traces of Hindu religion have clung to them.

"They will not eat eels and a few other animals because they think that in the mutations of the soul the spirits of their ancestors may inhabit them," Dr. Hough states.

"A long standing custom of the gypsy that is a survival, no doubt, of India, is their burning of the possessions of the dead. In 1900, in Maryland, chief Seth Lovell's gaily painted palatial wagon valued at \$2,000 and filled with his property was burned. The ceremony was conducted by his widow Rhoda, and several relatives who wept while the flames destroyed the gypsy chief's equipage."

The gypsies steadily tend to blend racially, as wanderlusting strangers with red hair, freckles, alien features, or un-gypsylike speech join a gypsy band and marry into gypsy families. It is difficult now for an anthropologist to find a pure gypsy type, but gypsy temperament runs as true to form as ever.

Science News-Letter, June 23, 1928

Medicine in Stars

Medicine-Astronomy

Aesculapius, the classical god of medicine, though promised a place in the stars by Zeus, has never till now been placed with his Olympian confreres among the celestial bodies.

This neglect, however, has been repaired. In a recent letter, Dr. Edwin B. Frost, director of the Yerkes Observatory, informed the American Medical Association that the medical profession is at last represented in the heavens by an asteroid of the fourteenth magnitude, circulating between the orbits of Mars and Jupiter. The tiny planet was christened Aesculapius at Dr. Frost's suggestion

by its discoverer, Prof. George Van Biesbroeck also of the Yerkes Observatory.

"Doctors wishing to consult their Patron Saint," said Dr. Frost, "will have to use a pretty good sized telescope, and we shall be glad to be of any assistance."

Science News-Letter, June 23, 1928

Long-distance electrical transmission of energy in the United States dates from 1893, when a current of high voltage was carried from Pomona to San Bernardino in California, a distance of about 19 miles.

Maya Glories—Continued

"They did not worship snakes and other animals, but raised them as the Cristianos raise cattle and hogs, and they offered these to the Sun in sacrifice.

"The ancianos did not kill every snake they saw, however little it might be, like the Cristianos do," an act which he illustrated with a stick. "They let them get old and fat and when the king ordained they killed them.

"They ate the flesh for food and made clothing and ornaments out of the skins and rendered the fat like the lard of the hog. The fat was burned in the hollow stone pots you see lying in the ruins as an offering to the Sun."

He asked if I had seen the black stains on the walls and ceilings of the inner rooms of the temple that stands on top of El Castillo, the highest building in Chichen Itza. That comes from burning snake oil, he stated.

The sun went down, the log was cut through, and the wife fell off the other end giggling, while the baby took up the machete.

"The snakes were different in the old days from what they are now," the Indian continued. "They had big mouths like large lizards and they had strong teeth. You have seen them in the frescoes. I don't believe there were any animals existing then that are not shown in the carvings and paintings in the temples.

"I believe the Castillo was built before the flood," he said, "I mean the Great Flood when Noah saved a pair of every kind of animal. Just how long ago was the Flood?" he asked.

Six thousand years, I told him. He showed surprise. His reckonings were all upset, and it took him a long time to struggle through his private system of logic and set the Christian faith up again in perfect accordance with what he believed of the story of his own race.

The unfortunate "break" about 6,000 years cost almost as many bug-bites there on the ground on the edge of the jungle in the dark. It was not until after nine o'clock that he got the two religions hooked up once more to his own satisfaction, after which he lighted the way, proud as any Greek logician, back to my own hut on the main road.

Science News-Letter, June 23, 1928

Industrialism and Idealism

Engineering

PROFESSOR MICHAEL PUPIN in *Scribner's*, June, 1928:

Just think of the thrills which I experienced during the earliest days after my landing at Castle Garden! There was the awe-inspiring elevated railroad and the embryo of the Brooklyn Bridge spinning out its span of slender wires like a spider's web high up in the air and across the East River.

Two years after my landing I saw the first telephone exhibited at the Centennial Exposition in Philadelphia. It repeated speech with perfect articulation. This was a great

thrill to everybody and particularly to an untutored immigrant like me, but it nearly persuaded me to go back to my native village. "No chance for me," said I, "in this country of magic, where men can make a simple steel disc speak the English language better than a Serbian greenhorn can speak it in spite of all the efforts of his clumsy vocal organs."

Two years later I experienced a similar thrill when I first listened to a phonograph. Edison's incandescent electrical lighting of 1882 mystified me and filled me with awe when

I compared it with the tallow candles of my native village. I shall never forget my emotions when I first gazed at the blazing flames of the roaring furnaces in the Pittsburgh steel district where millions of tons of steel were preparing the foundation of a new civilization. These and many other apparently miraculous workings of science and invention, witnessed by my untutored and impressionable mind, consoled me for what I had lost when I deserted the lovely animals of my native village and ran away to the land of machines.

Science News-Letter, June 23, 1928

The Church Organ

Music-Physics

JOHN REDFIELD, in *Music* (Knopf).

Of all the musical instruments which man employs there is no other he plays so badly as the organ. It is often almost impossible for a discriminating musician to listen to the playing of an organ, especially a church organ. The organists in some of the larger movie theaters are less offensive in their playing, but church organists as a rule are most exasperating. Their feet usually drag along a measure or two behind their hands, they do not scruple to hold any convenient note as long as they please while they poke stops or hunt a new piece of music, and in general they conduct themselves as if there were no such thing as rhythm, either measured or unmeasured, in the music they play. It will not avail the church organist to contend that his music is quasi-unmeasured; his complete lack of comprehension of unmeasured music is convincingly proved whenever his choir attempts to produce a polyphonic composition. If a church organist has the good fortune to hold a part-time job in some movie house he will usually be able to pick up the rudiments of rhythm sooner or later from the jazz band employed there. Otherwise the church organist remains the sorriest example of the professional musician anywhere to be found.

It is entirely possible that the organ has become too complicated a musical machine to be managed by one player. I am not at all certain that this is not the case. It might perhaps be advisable to relieve the organist of the duty of managing the stops, turning music, etc., by allowing

J. B. S. HALDANE in *Possible Worlds* (Harpers):

To the mouse and any smaller animal gravity presents practically no dangers. You can drop a mouse down a thousand-yard mine shaft; and, on arriving at the bottom, it gets a slight shock and walks away, provided that the ground is fairly soft. A rat is killed, a man is broken, a horse splashes. For the resistance presented to movement by the air is proportional to the surface of the moving object. Divide an animal's length, breadth, and height each by ten; its weight is reduced to a thousandth, but its surface only to a hundredth. So the resistance to falling in the case of the small animal is relatively ten times greater than the driving force.

An insect, therefore, is not afraid of gravity; it can fall without danger, and can cling to the ceiling with remarkably little trouble. It can go in for elegant and fantastic forms of

him an assistant. Even better, in my opinion, is the plan of producing the notes of the score mechanically, as on the reproducing piano, leaving the organist entirely free to give his undivided attention to stops, tempo, dynamics, and nuance in general.

Science News-Letter, June 23, 1928

Next year will be the 250th anniversary of the discovery of coal in America.

The United States has nearly 1,000 museums, most of them along the east coast.

On Being the Right Size

Anatomy

support like that of the daddy-long-legs. But there is a force which is as formidable to an insect as gravitation to a mammal. This is surface tension. A man coming out of a bath carries with him a film of water of about one-fiftieth of an inch in thickness. This weighs roughly a pound. A wet mouse has to carry about its own weight of water. A wet fly has to lift many times its own weight and, as every one knows, a fly once wetted by water or any other liquid is in a very serious position indeed. An insect going for a drink is in as great danger as a man leaning out over a precipice in search of food. If it once falls into the grip of the surface tension of the water—that is to say, gets wet—it is likely to remain so until it drowns. A few insects, such as water-beetles, contrive to be unwettable; the majority keep well away from their drink by means of a long proboscis.

Science News-Letter, June 23, 1928

A tortoise in the London Zoo is known to be more than 100 years old.

Two million crows was the estimated population of one crow roost in Pennsylvania.

Children in remote districts of Australia can take their school work by correspondence.

A Colorado firm is marketing Jerusalem artichokes in flakes like potato chips, artichoke jam, artichoke syrup, and relish, especially for diabetic patients who cannot eat sugar and starch.

FIRST GLANCES AT NEW BOOKS

A TEXTBOOK OF SYSTEMATIC BOTANY—Deane B. Swingle—*McGraw-Hill* (\$3). For a generation at least, ever since the study of botany forsook the ways of the "scientia amabilis" and began to devote itself more and more to morphology, to genetics, to physiology and ecology, botanists have been wishing for a book which they could put into the hands of their more promising students, who are not satisfied with just "keying things out in Gray," but want to know something about the philosophy of the process. Here it is at last, and it should prove a potent means for raising taxonomy, now the Cinderella of the botanical sisterhood, out of the ashes of neglect and restoring this amiable study to its rightful place. Professor Swingle gets together into one place and presents very compactly and yet very readably the gist of taxonomic science. He speaks without fear on the ticklish questions that rouse controversy among the brethren, but with such moderation and good nature as to offend no one. He sums up the principal families in brief descriptive sections. He suggests whither future taxonomic development may lead. The McGraw-Hill Book Company have good right to be proud of having published this volume—and it ought to sell like hot cakes.

Botany

Science News-Letter, June 23, 1928

SOME FAMOUS MEDICAL TRIALS—Leonard A. Parry—*Scribner's* (\$2.50). Readers of detective and mystery stories will be disappointed in this book, which, on the other hand, will doubtless appeal to criminologists. Famous trials of physicians are briefly reviewed with comments on the judicial and legal procedures. While the material would furnish the basis for many a thrilling tale, the treatment is not such as would appeal to the popular imagination.

Medicine

Science News-Letter, June 23, 1928

WILD ANIMAL PETS—William and Irene Finley—*Scribner's* (\$3). The authors have made friends and domestic companions of such shy creatures as snowshoe rabbits and armadillos and of such unlikely ones as bobcats and condors; in their book they tell most entertainingly how it is done.

Zoology

Science News-Letter, June 23, 1928

THE BRAIN FROM APE TO MAN—Frederick Tilney, New York—*Paul B. Hoeber* (\$25). Dr. Tilney set out to prove the theory of evolution by a careful study and comparison of the brains and skulls of all primates, historic and prehistoric. The results of his studies have so far convinced him of the truth of the theory that he now considers interest in the subject to be centered about the future development of man's brain.

While it is unfortunate that many of the specific points in support of the theory are so technical as to be unintelligible to the average lay reader, there are many other chapters that give a vivid picture of man's development in terms which anyone can understand. Nor does Dr. Tilney fail to make himself understood when it comes to a restatement of his anatomical observations and their significance. "That there was a definite prehuman stock, a stock capable of producing both anthropoid apes and man, cannot be disputed. But at least five critical and closely interdependent specializations determine the status of the human race: the appearance (1) of the human brain, (2) of the human foot, (3) of the human hand, (4) of the erect posture with bipedal locomotion, and (5) a terrestrial mode of life."

Further consolation for those unhappy ones who believed that the evolutionary theory implied a direct simian ancestry may be found elsewhere in Dr. Tilney's book. "There are unquestionable differences between the anthropoids and man which justify the opinion of extremely remote kinship at best, even in spite of striking similarities." These very similarities, Dr. Tilney believes, are due not so much to kinship as to similar problems in the prehistoric struggle for existence which caused similar structural modifications in the anthropoids and in man.

Dr. Tilney is one of those who advance the theory that man first appeared on the earth somewhere in Central Asia, much further east than legendary geography leads one to believe. From this point Dr. Tilney traces man's migration along eastern, northern, western and southern routes, showing that only along the western route has there been marked development along intellectual and cultural lines.

Evolution

Science News-Letter, June 23, 1928

NATURE RAMBLINGS BY FRANK THONE

Natural History



Muskrat

A generation ago, muskrat furs were not held in very high regard; today, with the supply of the more precious peltries of the Canadian high north becoming depleted and the Siberian supply seriously interfered with by the effects of political revolution, muskrat has become a valuable staple in the fur market. So much so, indeed, that muskrat "farming" is taking its place among our industries, along with the farming of the highly expensive silver fox and the rigidly protected sealies of the Pribilof Islands.

Muskrat "farming," however, partakes more of the nature of protected and systematized trapping on private preserves than it does of the exploitation of fairly well domesticated animals like the fox. The principal commercial muskrat area is in the vast swamps of the Gulf edge of Louisiana, where great private holdings of the almost valueless land (if it can be called land) are parcelled off and leased out or sold to the trappers. These men know from experience how much trapping a given piece will stand without being depleted, and practice conservation of the animals for the benefit of their own business.

The great Mississippi flood last year temporarily disrupted muskrat "farming" in Louisiana. It did not wipe out the animals, as was at first thought might be the case, but it scattered them through a considerable stretch of new territory. Last winter the trappers were actively engaged in following them to their new haunts and trapping them alive for transportation back to their old homes. It is expected that the restocking will be successful, and that soon the muskrat "farms" will once more be going full blast.

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A Statement of Purpose

(The aims, ideals and aspirations of an institution)

SCIENCE SERVICE is a unique institution, established at Washington for the purpose of disseminating scientific information to the public. It aims to act as a sort of liaison agency between scientific circles and the world at large. It interprets original research and reports the meetings of learned societies in a way to enlighten the layman. The specialist is likewise a layman in every science except his own and he, too, needs to have new things explained to him in non-technical language. Scientific progress is so rapid and revolutionary nowadays that no one can keep up with it from what he learned at school. Science Service endeavors to provide life-continuation courses in all the sciences for newspaper readers anywhere in America without tuition fees or entrance examinations.

In a democracy like ours it is particularly important that the people as a whole should so far as possible understand the aims and achievements of modern science, not only because of the value of such knowledge to themselves but because research directly or indirectly depends upon popular appreciation of its methods. In fact the success of democratic institutions, as well as the prosperity of the individual, may be said to depend upon the ability of people to distinguish between science and fakes, between the genuine expert and the pretender.

Science Service spares no pains or expense in the endeavor (1) to get the best possible quality of popular science writing and (2) to get it to the largest possible number of readers. If in doing this it can make both ends meet, so much the better. If not, it will do it anyway.

Through the generosity of E. W. Scripps, Science Service has been assured of such financial support as to insure its independence and permanence. Mr. Scripps's long and wide experience as a newspaper editor and proprietor had convinced him of the importance of scientific research as the foundation of the prosperity of the nation and as guide to sound thinking and living and he realized the need for an independent agency that would bring the results of research to the attention of the entire people so these could be applied to the solution of their personal, social or political problems.

Science Service is chartered as a non-profit-making institution and all receipts from articles, books, lectures and films are devoted to opening up new avenues for the diffusion of knowledge and developing promising methods of popular education. Although Science Service has a philanthropic purpose, it is conducted on business principles, with the aim of making each branch of its activities ultimately self-supporting so far as possible. All acceptable contributions are paid for and all published articles are charged for.

Science Service is under the control of a Board of Trustees composed of ten scientists and five journalists. The leading national organizations of all the sciences, the National Academy of Sciences, the National Research Council, and the American Association for the Advancement of Science, appoint three trustees each.

Science Service occupies offices in the magnificent new building of the National Academy of Sciences and the National Research Council on Potomac Park opposite the Lincoln Memorial.

This strategic situation enables the Service to keep constantly in touch with the progress of the sciences because new inventions and discoveries are promptly put on exhibition in the building, and the Council brings together investigators in the various sciences and leaders in engineering and industry from all parts of the country.

Science Service is not a governmental institution, but it is in close contact with the numerous governmental bureaus of research. It is not under the control of any clique, class or commercial interest. It is not the organ of any single scientific association. It serves all the sciences. It engages in no propaganda, unless it be called propaganda to urge the value of research and the usefulness of science.

Science Service began its work on January 1, 1921, and has now a sizable office staff with a large corps of contributors in the chief research institutions of this country and Europe.